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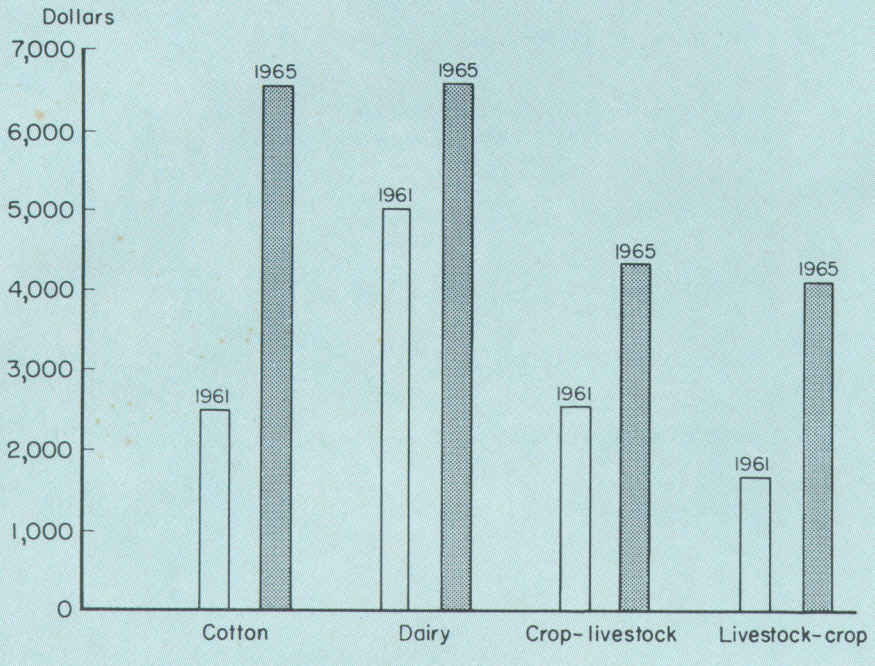
Factors Affecting Operator's Labor Income on Alabama Farms



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Factors Affecting Operator's Labor Income on Alabama Farms

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INTRODUCTION

ADVANCES IN TECHNOLOGY and changes in prices of inputs and outputs have made the business of farming one of the most challenging occupations in modern society. A farmer must be constantly alert for external changes and, whenever possible, use them to his advantage by making certain adjustments in his operations.

This study was concerned with changes which Unit Approach farmers (group of farmers cooperating with the Extension Service) made during the 5-year period 1961-1965. Specific objectives were (1) to describe changes in certain factors considered to affect operator's labor income, and (2) to make implications regarding how these changes affected operator's labor income.

Fulfillment of these objectives should provide information a farmer could use in making critical comparisons of his farming operation with the average Unit Approach farmer. For instance, did his operator's labor income change in the same direction and with the same degree as did the operator's labor income of the average Unit Approach farmer? If not, how did changes in factors influencing his operator's labor income compare with changes in these factors for the Unit Approach farmers? Such an analysis would indicate strong and weak points of the farm in question.

ASSEMBLY OF DATA

Data analyzed in this study were provided by farmers participating in the Unit Approach records project during the 5-year period 1961-65. County Extension personnel assisted each farmer in completing a farm business summary. Farm business summaries completed at end of the year were sent to the Cooperative Extension Service at Auburn University.

Personnel of the Extension Service and the Agricultural Experiment Station at Auburn University transferred the farm business summary data to code sheets and made additional calculations such as per cent calf crop and cash receipts per open acre.

Farms were grouped into seven farm types depending on which enterprise or enterprises contributed most to total cash receipts. A farm deriving 50 per cent or more of its total cash receipts from a single enterprise was placed in a group bearing the name of that enterprise. Farms that did not have a single enterprise accounting for as much as 50 per cent of the total cash receipts were classed as crop-livestock farms if a larger percentage of the income was derived from crop enterprises or livestock-crop farms if a larger percentage of the total cash receipts was derived from livestock enterprises. The seven types of farms were cotton, dairy, hogs, beef, layers, crop-livestock, and livestock-crop. Hogs, beef, and layer farms were not analyzed because the size of the sample was too small. The numbers of each type of farm for the 5-year period are given in Table 1.

TABLE 1. UNIT APPROACH FARMS INCLUDED IN RECORD ANALYSIS BY TYPE, ALABAMA

Farm type	1961	1962	1963	1964	1965
	No.	*No.*	*No.*	*No.*	*No.*
Cotton	101	103	124	94	68
Dairy	73	61	64	55	49
Hog	32	26	17	18	21
Beef	23	25	24	20	11
Layer	21	11	9	9	9
Crop-livestock	115	86	99	78	65
Livestock-crop	85	55	51	44	35
Total	450	367	388	318	258

Data on cards for the entire 5-year period were summarized by regression methods on the computer. All data were transferred from cards to magnetic tape and sorted by year and farm type. New data cards containing only the desired factors were then

punched. The new data cards, one for each farm, were used in making summaries and calculations.

Limitations of Data

Although some of the data supplied by Unit Approach farmers were estimates, there were two reasons the data were assumed to be reliable: the data were checked by Extension personnel and estimates obviously incorrect were returned to the farmer for correction; the farmers who participated in the Unit Approach records project had to keep some records and most of them kept fairly complete records.

It should be kept in mind, however, that the Unit Approach farmers were probably among the better Alabama farmers. No attempt was made to obtain a random sample. This assumption was supported by the following: (1) Participation of farmers in the records project indicated their willingness to cooperate with Extension workers in improving their farming operation. (2) Although, Dairy Herd Improvement Association members were considered as being among the best dairymen in the State, the average production of Unit Approach dairy farmers compared favorably with the average production of that group.

Another shortcoming of the data was the fact that farmers who supplied data in 1 year were not necessarily the farmers who supplied data in another year. Some farmers dropped out of the Unit Approach program and others were added. However, it was assumed that the types of farms were representative for the 5-year period.

A downward trend in the number of each type of farm occurred during the study period, Table 1. The reasons for this trend were not known nor was there any information as to the effect of this trend on the sample of farms. This was probably the most serious limitation of the data.

SELECTION OF FACTORS CONSIDERED TO AFFECT OPERATOR'S LABOR INCOME

Eighteen factors were selected for dairy and cotton farms and 17 were selected for crop-livestock and livestock-crop farms, Table 2.

Factors selected for crop-livestock and livestock-crop farms were identical, but this group of factors differed from both the factors selected for cotton farms and those selected for dairy farms.

TABLE 2. FACTORS CONSIDERED TO AFFECT OPERATOR'S LABOR INCOME OF UNIT APPROACH FARMERS IN ALABAMA BY FARM TYPE

Cotton	Dairy	Crop-livestock	Livestock-crop
		Common factors	
Livestock invest.	Livestock invest.	Livestock invest.	Livestock invest.
Total invest.	Total invest.	Total invest.	Total invest.
Total cash receipts	Total cash receipts	Total cash receipts	Total cash receipts
Total cash expenses	Total cash expenses	Total cash expenses	Total cash expenses
Acres open land	Acres open land	Acres open land	Acres open land
PMWU's on crops	PMWU's on crops	PMWU's on crops	PMWU's on crops
PMWU's on livestock	PMWU's on livestock	PMWU's on livestock	PMWU's on livestock
Total PMWU's	Total PMWU's	Total PMWU's	Total PMWU's
Man equivalents	Man equivalents	Man equivalents	Man equivalents
PMWU's/man equiv.	PMWU's/man equiv.	PMWU's/man equiv.	PMWU's/man equiv.
Cash receipts/open A	Cash receipts/open A	Cash receipts/open A	Cash receipts/open A
Cash expenses/open A	Cash expenses/open A	Cash expenses/open A	Cash expenses/open A
		Unique factors	
Machinery invest.	Receipts from milk	Machinery invest.	Machinery invest.
Farm work off farm	Feed bought	Inv. bldg., fen./open A	Inv. bldg., fen./open A
Fertilizer bought	No. dairy cows	Total invest./open A	Total invest./open A
Acres operated	Cwt. milk sold	Crop sales/open A	Crop sales/open A
Acres cotton	Cwt. milk sold/cow	Lives. sales/open A	Lives. sales/open A
Cotton yield	Lives. sales/open A		

The Unit Approach farmers who supplied the data for this study were originally in the Unit Test Demonstration program or the Farm and Home Development program. These farmers were selected by county Extension Service personnel to provide basic data about their farming operation to Auburn University. One of their objectives was to demonstrate how better management used in their entire farming operation could result in improved returns to their operator's labor.

Operator's labor income is the annual return to the farmer for his labor. This is the income left after all other factors of production have been paid. To calculate operator's labor income, first calculate net farm income, which is total cash receipts minus total cash expenses and value of unpaid family labor plus change in inventory. Then subtract an interest charge on average capital investment from net farm income, and the result is operator's labor income.

PMWU is the abbreviation for productive man work unit. One PMWU is the amount of labor that an average worker using average equipment can accomplish in a 10-hour day.

COTTON FARMS

The average value of operator's labor income of Unit Approach cotton farmers more than doubled over the 5-year period, increasing from $2,500 to $6,560. Although inflation accounted for a small percentage of the increase in operator's labor income, its effect was assumed to be negligible and the increase was assumed to be the result of changes in the factors listed in Table 3.

Average total investment of Unit Approach cotton farmers increased 87 per cent, from $26,100 in 1961 to $48,700 in 1965. Ten per cent of the increase was from an increase in livestock investment (including poultry) and 28 per cent was from an increase in machinery investment. The remaining 62 per cent of the increase was from increased investment in land, timber, ponds, buildings and fences, and increased operating investment in feed, seed, and supplies. The number of acres operated increased 54 per cent, from 223 to 343 acres.

Livestock investment increased 60 per cent, from $3,600 to $5,800, and accounted for 14 per cent of total investment in 1961 and 12 per cent in 1965. Thus, livestock enterprises expanded, but the expansion was slightly less in proportion than expansion of other enterprises.

TABLE 3. UNIT APPROACH COTTON FARMS: ANNUAL AVERAGES FOR FACTORS CONSIDERED TO AFFECT OPERATOR'S LABOR INCOME, ALABAMA, 1961-1965

Factor	Unit	Average				
		1961	1962	1963	1964	1965
Lives. invest.	Dol.	3,600	3,000	3,900	4,300	5,800
Total invest.	Dol.	26,100	25,100	31,600	35,000	48,700
Total cash rec.	Dol.	11,970	13,100	16,010	16,650	24,110
Total cash exp.	Dol.	8,950	10,130	11,340	12,280	18,790
Acres open land	Acre	165	174	189	188	238
PMWU's on crops	No.	513	527	521	469	500
PMWU's on lives.	No.	94	87	105	106	105
Total PMWU's	No.	628	627	636	583	618
Man equivalents	No.	2.7	2.8	2.8	2.4	2.4
PMWU's/man eq.	No.	239	239	247	249	264
Cash rec./open A	Dol.	73	73	86	93	113
Cash exp./open A	Dol.	51	47	58	65	85
Mach. invest.	Dol.	5,200	5,600	6,200	7,900	11,600
Farm work off farm	Dol.	170	190	240	280	740
Fertilizer bought	Dol.	1,180	1,460	1,640	1,780	2,570
Acres operated	Acre	223	232	274	267	343
Acres cotton	Acre	43	51	52	55	76
Cotton yield	Lb. lint	495	471	603	642	764
Operator's labor inc.	Dol.	2,500	2,590	4,190	3,370	6,560

The contribution of livestock enterprises to gross farm receipts was not calculated, but the contribution was assumed to be a significant amount. For example, a herd of 30 beef brood cows valued at $5,000, with each producing a 400 pound calf per year that sold at $0.20 per pound, would add approximately $2,000 annually to total cash receipts. Livestock enterprises were also important in that they increased the efficiency of labor by providing a use for labor in time periods when labor was not required on crop enterprises. By increasing the investment in livestock and expanding livestock enterprises, the number of PMWU's on livestock increased from 94 in 1961 to 105 in 1965.

Machinery investment increased 123 per cent from $5,200 to $11,600. The increased investment was primarily a result of purchases of larger machinery and mechanical cotton, corn, and peanut harvesters. The increase in numbers of mechanical harvesters employed by Unit Approach farmers was not known, but the number of mechanical cotton harvesters in Alabama increased from 736 in 1960 to 2,908 in 1966.[1]

Increased mechanization brought about changes in other factors considered to affect operator's labor income. The value of farm work off the farm increased 335 per cent, from $170 to $740. This increase was primarily the result of increased use of mechanical harvesters for custom harvesting.

Also accompanying the increase in mechanization was an increase in the number of acres of cotton per farm, from 43 to 76. Although this study was not concerned with data for 1966, it was likely that the average cotton acreage of Unit Approach cotton farmers increased even more in 1966 because of a change in the allotment program that allowed farmers to buy and sell allotments.

The number of PMWU's on crops declined from 513 to 500 despite increase in acres of cotton. This indicated substitution of machinery for labor. Hand-harvested cotton was estimated to require 8.5 PMWU's per acre for a yield of 250 pounds of lint plus an additional PMWU for each 100 pounds of lint over 250 pounds. Machine harvested cotton was estimated to require only 3.8 PMWU's per acre irrespective of yield. Therefore, the increased number of mechanical cotton harvesters had a reducing effect on the number of PMWU's on crops.

Mechanization also tended to decrease the number of men re-

[1]Summary of County Agents' Annual Reports, 1960 and 1966. Cooperative Extension Service, Auburn Univ., Auburn, Ala.

quired to operate a farm. The average number of man equivalents decreased from 2.7 to 2.4 even though cotton acreage almost doubled and the number of PMWU's required on livestock enterprises increased.

Labor efficiency, as measured by PMWU's per man equivalent, increased from 239 to 264 PMWU's per man equivalent. In other words, the average farm provided each man equivalent with 264 days of labor in 1965; whereas it had provided only 239 days in 1961. The 1965 level of 264 PMWU's per man equivalent was above the desired minimum level of 250 PMWU's per man equivalent generally agreed upon by farm management specialists.

Value of fertilizer bought went from $1,180 to $2,570, an increase of 118 per cent. In 1961, the value of fertilizer bought per acre operated was $5.30, the value of fertilizer bought per acre of open land was $7.16, and the value of fertilizer bought per acre of cotton was $27.45. Respective values for 1965 were $7.50, $10.80, and $33.82. One should not infer from the values of fertilizer bought per acre of cotton that quantities of fertilizer valued at those amounts were applied to each acre of cotton. Some of the fertilizer was undoubtedly used on other enterprises.

Although cotton yield is highly dependent on weather conditions and varies from year to year, there was a definite increase in yield over the 5-year period. The average yield for the 2-year period 1961-1962 was 483 pounds of lint per acre, and the yield from 1964-1965 was 703 pounds of lint per acre. The increase in yield supported the conclusion that fertilization rate was probably higher in 1965 than in 1961. However, this did not imply that all the increase in yield was caused by an increase in fertilization rate. Other improved practices and weather also had an effect on yield.

Size of farm as indicated by acres of cotton, acres of open land, and acres operated increased significantly. These increases and the increase in mechanization were complementary. To operate expensive machinery efficiently, farmers must use that machinery productively as much as possible to reduce the cost per unit of output.

Total cash receipts, one of the best indicators of volume of business, increased from $11,970 to $24,110, an increase of 101 per cent. At the same time, total cash expenses increased from $8,950 to $18,790, an increase of 110 per cent. Although the percentage increase in cash receipts was less than the percentage

increase in cash expenses, net cash income (cash receipts-cash expenses) improved from $3,020 in 1961 to $5,320 in 1965.

Values of operator's labor income per acre operated, per acre of open land, and per acre of cotton all increased over the 5-year period indicating that profit per acre increased with acreage. Improved practices and more efficient use of resources were the reasons for this improvement.

Summary and Implications of Changes in Factors Considered to Affect Operator's Labor Income from Cotton Farms

Unit Approach cotton farmers were successful in combating higher costs of labor and other inputs. They increased their operator's labor income from an average of $2,500 in 1961 to $6,560 in 1965. Evidence in the preceding section indicated the increase was the result of an increase in volume of business, substitution of machinery for labor, and an increase in the yield of cotton.

Indicators of volume of business which showed large increases were machinery investment (123 per cent), total cash expenses (110 per cent), total cash receipts (101 per cent), total investment (87 per cent), acres of cotton (77 per cent), livestock investment (60 per cent), acres operated (54 per cent), and acres open land (44 per cent). Total PMWU's and number of man equivalents both decreased but this was caused by a substitution of machinery for labor rather than a reduction in the amount of cotton and secondary crops produced.

Increased cotton yield was primarily the result of an increase in fertilizer used per acre although improvements in other practices were also important. The increase in fertilizer used per acre, in conjunction with higher costs of mechanization, raised cash expenses per open acre from $51 to $85. However, an increase in cash receipts per open acre from $73 to $113 more than offset the increase in cash expenses per open acre. Thus, the increase in cotton yield did have a positive effect on operator's labor income.

Although crop and livestock enterprises were expanded, an increase in mechanization decreased the total number of PMWU's from 628 to 618. However, the reduction in labor force from 2.7 to 2.4 man equivalents was of greater proportion than the reduction in total PMWU's and the result was an increase in labor efficiency from 239 to 264 PMWU's per man equivalent.

DAIRY FARMS

Operator's labor income from dairy farms changed from $5,010 in 1961 to $6,640 in 1965, an increase of 32 per cent. When compared with the 162 per cent increase in operator's labor income from cotton farms, this change was relatively small. However, average operator's labor income from dairy farms was still greater than operator's labor income from cotton farms in 1965. Averages of factors considered to bring about the change in operator's labor income are tabulated in Table 4.

Unit Approach dairy farmers had a much higher total investment than did cotton farmers although the difference diminished during the 5-year period. Dairy farmers increased total investment $12,900, from $62,700 in 1961 to $75,600 in 1965. Cotton farmers increased their total investment by an average of $22,600 during this time period.

The main reason for the difference in the changes in total investment was fewer technological advances were made in dairy farming than in cotton farming. Most dairy farmers were already using a bulk milk tank and pipeline milking system in 1961; whereas cotton farmers only began extensive use of mechanical cotton harvesters and chemical weed control in the early 1960's. Cotton farmers increased their operator's labor income by expanding acreage and utilizing these technological advances; whereas, dairy farmers had to rely more heavily on improving the efficiency of an almost constant level of technology.

Investment in livestock per dairy cow was $342 in 1961 and $325 in 1965. This decrease was not expected since it was assumed that farmers would have improved their herds and thereby increased livestock investment per cow. However, the decrease could have been the result of (1) replacement of older cows with younger stock from the dairy herd itself, or (2) a decrease in value of dairy cows because of the reduction in number of dairy farmers and the accompanying decrease in demand for dairy cows.

Cash receipts from milk increased from $20,350 to $30,530, an increase of 50 per cent. Cash receipts from milk per cow were $384 in 1961 and $449 in 1965. In 1961, receipts from milk accounted for 79 per cent of total cash receipts; whereas in 1965 it accounted for 78 per cent of total cash receipts.

Total cash expenses increased from $21,190 to $34,480, an increase of 63 per cent. Total cash expenses were greater than milk

TABLE 4. UNIT APPROACH DAIRY FARMS: ANNUAL AVERAGES FOR FACTORS CONSIDERED TO AFFECT OPERATOR'S LABOR INCOME, ALABAMA, 1961-1965

Factor	Unit	Average				
		1961	1962	1963	1964	1965
Lives. invest.	Dol.	18,100	18,600	19,500	18,900	22,100
Total invest.	Dol.	62,700	62,800	65,100	63,900	75,600
Total cash rec.	Dol.	25,730	26,720	31,540	30,350	39,030
Total cash exp.	Dol.	21,190	21,410	26,430	24,540	34,480
Acres open land	Acre	236	263	278	259	261
PMWU's on crops	No.	224	250	257	226	257
PMWU's on lives.	No.	543	559	577	552	566
Total PMWU's	No.	777	814	841	782	835
Man equivalents	No.	2.7	2.8	2.9	2.7	2.9
PMWU's/man eq.	No.	292	309	286	292	288
Cash rec./open A	Dol.	127	120	133	148	185
Cash exp./open A	Dol.	101	88	110	124	170
Rec. from milk	Dol.	20,350	20,870	23,470	24,040	30,530
Feed bought	Dol.	5,850	5,700	7,570	7,430	9,690
Dairy cows	No.	53	57	59	56	68
Cwt. milk sold	No.	3,758	3,885	4,415	4,231	5,346
Cwt. milk sold/cow	No.	68	68	70	74	83
Lives. sales/open A	Dol.	114	106	117	135	171
Operator's labor inc.	Dol.	5,010	4,870	4,740	5,290	6,640

receipts in both 1961 and 1965, indicating the importance of secondary enterprises.

Value of feed bought increased 65 per cent from $5,850 to $9,690. There was an accompanying increase in the value of feed bought per cow, an increase from $110 to $142 per cow. This could have been attributed to (1) a reduction in the amount of feed produced per cow, (2) an increase in feed prices, or (3) an increase in the level of feeding.

The increase in number of hundredweights of milk sold from 68 to 83 per cow was evidence of more intensive feeding. Therefore, it was concluded that the primary reason for the increase in the value of feed bought was an increase in level of feeding.

Labor requirements on dairy farms increased because of expansion of both livestock and crop enterprises and resulted in an increase in the number of men required to operate a farm. The increases in total PMWU's and number of man equivalents were of such proportion that labor efficiency remained almost constant, decreasing from 292 to 288 PMWU's per man equivalent. The relatively high level of labor efficiency was attributable to the fact that dairying requires at least one man equivalent of non-seasonal labor for milking and feeding the herd.

The average number of acres of open land per dairy farm increased 25 acres, from 236 to 261, as opposed to a 73-acre increase in the average size of cotton farms. Despite the relatively small increase in acres of open land, the number of cows increased from 53 to 68, causing a reduction in the amount of open land per cow from 4.5 acres in 1961 to 3.8 acres in 1965. This indicated that more efficient use was made of land.

Summary and Implications of Changes in Factors Considered to Affect Operator's Labor Income from Dairy Farms

Unit Approach dairy farmers increased their average operator's labor income from $5,010 in 1961 to $6,640 in 1965. All factors considered to affect operator's labor income, with the exception of PMWU's per man equivalent, also increased during the 5-year period. The decrease in PMWU's per man equivalent was so small it was not considered significant.

Factors that are usually considered to be indicators of volume of business increased the most during this period. These were: receipts from milk (50 per cent), total cash receipts (52 per cent), feed bought (66 per cent), hundredweight of milk sold (42 per cent), cash receipts per open acre (46 per cent), cash

expenses per open acre (68 per cent), and livestock sales per open acre (50 per cent).

A significant improvement in rate of milk production also occurred. Average production in 1961 was 6,800 pounds per cow, and by 1965 it had increased to 8,300 pounds per cow.

Little can be said about the combination of enterprises except that receipts other than from milk accounted for approximately 20 per cent of total cash receipts in both 1961 and 1965. Thus, receipts from products other than milk were important.

Labor efficiency was already at a relatively high level (approximately 290 PMWU's per man equivalent) in 1961 and remained almost constant.

Evidence indicated that volume of business factors and rate of milk production had the most influence on operator's labor income.

CROP-LIVESTOCK FARMS

Operator's labor income of crop-livestock farmers increased from $2,640 to $4,280 during the 1961-1965 period. The 1965 level of operator's labor income was lower than the level earned by cotton and dairy farmers whose farming was characterized by specialization rather than diversification. Average changes in factors considered to affect operator's labor income are in Table 5.

In 1961, average operator's labor income of crop-livestock farmers was $140 greater than the average operator's labor income of cotton farmers. Tables 3 and 5 show that average amounts of some of the factors considered to affect operator's labor income were also comparable in that year. Since both types of farms were primarily involved in crop production, and the increase in average operator's labor income of cotton farmers exceeded the increase in income of crop-livestock farmers, it was assumed that comparisons of changes in factors considered to affect operator's labor income of both types of farms would indicate reasons for the increases in income and reasons for the difference in the increases.

Levels and increases in livestock investment and machinery investment of crop-livestock farmers were comparable to those of cotton farmers. Livestock investment of crop-livestock farmers increased from $3,200 to $4,800 and machinery investment increased from $5,000 to $9,600. Machinery investment should have increased more than livestock investment since these farmers were concentrating more on crop production than on livestock production.

TABLE 5. UNIT APPROACH CROP-LIVESTOCK FARMS: ANNUAL AVERAGES FOR FACTORS CONSIDERED TO AFFECT OPERATOR'S LABOR INCOME, ALABAMA, 1961-1965

Factor	Unit	Average				
		1961	1962	1963	1964	1965
Lives. invest.	Dol.	3,200	3,700	4,200	4,200	4,800
Total invest.	Dol.	25,900	29,100	30,700	31,000	38,500
Total cash rec.	Dol.	10,760	12,390	13,920	14,320	18,510
Total cash exp.	Dol.	7,680	9,230	10,310	10,220	14,490
Acres open land	Acre	157	169	176	186	208
PMWU's on crops	No.	353	361	332	313	342
PMWU's on lives.	No.	88	102	101	106	114
Total PMWU's	No.	454	476	451	436	464
Man equivalents	No.	2.2	2.2	2.0	1.9	2.0
PMWU's/man eq.	No.	214	224	234	243	237
Cash rec./open A	Dol.	76	73	79	89	96
Cash exp./open A	Dol.	52	43	55	62	72
Mach. invest.	Dol.	5,500	6,000	6,900	7,000	9,600
Inv. bldg., fence/open A	Dol.	27	22	23	24	27
Total invest./open A	Dol.	196	172	176	196	211
Crop sales/open A	Dol.	48	47	53	60	61
Lives. sales/open A	Dol.	17	18	16	19	19
Operator's labor inc.	Dol.	2,640	2,510	3,400	3,360	4,280

Average total investment of crop-livestock and cotton farmers differed by only $200 in 1961. Cotton farmers increased total investment from $26,100 to $48,700; whereas crop-livestock farmers increased total investment from $25,900 to $38,500. Since both types of farms had comparable increases in livestock and machinery investments, it was apparent that cotton farmers invested more heavily in land. This conclusion was supported by the fact that cotton farmers increased their acreage of open land 73 acres, from an average of 165 to 238 acres. Crop-livestock farmers also increased their acreage of open land, but the increase was only 51 acres, from 157 to 208 acres.

Labor efficiency was an area in which crop-livestock farmers were deficient. The number of PMWU's per man equivalent increased from 214 to 237, but further improvement was needed. The number of man equivalents decreased from 2.2 to 2.0 and the total number of PMWU's increased from 454 to 465. The number of PMWU's on crops decreased from 353 to 342 because of increased mechanization. The number of PMWU's on livestock increased from 88 to 114.

The farming operations of cotton farmers were larger than those of crop-livestock farmers in both 1961 and 1965. There was little difference in the size of livestock enterprises as measured by PMWU's on livestock or investment in livestock. However, cotton farmers averaged approximately 150 more PMWU's on crops than did crop-livestock farmers in both 1961 and in 1965.

There was a significant increase in the volume of business of crop-livestock farmers. Total cash receipts increased from $10,760 to $18,510, and total cash expenses increased from $7,680 to $14,490. These increases were definite improvements, but they were not as large as respective increases in total cash receipts and total cash expenses of cotton farmers.

Crop-livestock farmers increased cash receipts per open acre from $76 to $96 and cash expenses per open acre from $52 to $72. The difference in cash receipts per open acre and cash expenses per open acre was the same in both 1961 and 1965. On the other hand, cotton farmers increased cash receipts per open acre from $73 to $113 and cash expenses per open acre from $51 to $85. The difference in cash receipts per open acre and cash expenses per open acre was $6 less in 1961 than in 1965. Cotton farmers had a larger difference in cash receipts per open acre and cash expenses per open acre in 1965 plus a larger number of open acres. These differences in the two farm types had a large in-

fluence in making cotton farms more profitable than crop-livestock farms.

Summary and Implications of Changes in Factors Considered to Affect Operator's Labor Income From Crop-Livestock Farms

Unit Approach crop-livestock farmers increased their average operator's labor income from $2,640 in 1961 to $4,280 in 1965. All of the factors assumed to affect operator's labor income, with the exception of PMWU's on crops, number of man equivalents, and average investment in buildings and fences per open acre, also increased.

Factors which increased the most were volume of business factors: total cash expenses (89 per cent), machinery investment (74 per cent), total cash receipts (72 per cent), livestock investment (50 per cent), and total investment (49 per cent). The number of PMWU's on crops and the number of man equivalents are also volume of business factors but they decreased because of substitution of machinery for labor.

The number of men used to operate a crop-livestock farm decreased from 2.2 to 2.0 despite increases in total PMWU's and acres of open land. Labor efficiency increased from 214 to 237 PMWU's per man equivalent primarily because of increased mechanization, but additional improvement was needed in this area.

Crop sales per open acre increased from $48 to $61 and livestock sales per open acre increased from $17 to $19, indicating an increase in production rates.

There was little difference in the values of operator's labor income of cotton and crop-livestock farmers in 1961. Operator's labor income of crop-livestock farmers did not increase in the 5-year period as much as did the income of cotton farmers, although many of the factors considered to affect operator's labor income of both types were comparable in 1961. Two of the reasons cotton farmers increased operator's labor income more than did crop-livestock farmers were: (1) cotton farmers increased investment in land and size of operation much more than did crop-livestock farmers, and (2) cotton farmers widened the gap between cash receipts per open acre and cash expenses per open acre; whereas crop-livestock farmers held the difference at a constant level.

LIVESTOCK-CROP FARMS

Operator's labor income of livestock-crop farmers more than doubled during the 5-year period, increasing 142 per cent from $1,690 to $4,090, Table 6. This was a definite improvement, but livestock-crop farms were still not as profitable as the other three farm types.

Livestock-crop farmers significantly increased their total investment, machinery investment, and livestock investment during the 5-year period. The magnitude of the increases in total investment and machinery investment was roughly the same as the increases in these factors for cotton and crop-livestock farmers. Livestock-crop farmers increased livestock investment from $4,700 to $8,200. This increase was much larger than the increase in livestock investment of cotton and crop-livestock farmers, but this was to be expected since livestock-crop farmers were primarily involved in the production of livestock.

Total cash receipts increased from $9,060 to $16,850, and total cash expenses increased from $7,080 to $12,880. The increase in total cash receipts was comparable to the increase in total cash receipts of crop-livestock farmers but less than the increase in total cash receipts of cotton farmers. The difference between total cash receipts and total cash expenses improved from $1,980 to $3,970.

One of the most outstanding improvements in the operations of livestock-crop farmers was in labor efficiency. The number of men used to operate a farm decreased from 1.8 to 1.7 despite an increase in acres of open land from 120 to 188, an increase in PMWU's on crops from 201 to 247, an increase in PMWU's on livestock from 174 to 223, and an increase in total PMWU's from 386 to 476. As a result of these changes, labor efficiency increased from 217 to 275 PMWU's per man equivalent. Although dairy farmers had a higher level of labor efficiency, livestock-crop farmers had the largest increase in labor efficiency during the period.

Average investment in buildings and fences per open acre decreased from $61 to $39. Since buildings and fences do not depreciate rapidly and the number of acres of open land increased an average of 68 acres, little was invested in buildings and fences on the additional land. Another possible explanation for the decrease may be that the additional land was rented rather than owned. In such cases, total investment in buildings and fences

TABLE 6. UNIT APPROACH LIVESTOCK-CROP FARMS: ANNUAL AVERAGES FOR FACTORS CONSIDERED TO AFFECT OPERATOR'S LABOR INCOME, ALABAMA, 1961-1965

Factor	Unit	Average				
		1961	1962	1963	1964	1965
Lives. invest.	Dol.	4,700	5,500	6,400	6,800	8,200
Total invest.	Dol.	28,700	31,200	35,600	41,000	44,400
Total cash rec.	Dol.	9,060	10,410	11,260	14,530	16,850
Total cash exp.	Dol.	7,080	7,510	8,890	11,840	12,880
Acres open land	Acre	120	150	157	177	188
PMWU's on crops	No.	201	228	221	222	247
PMWU's on lives.	No.	174	171	181	193	223
Total PMWU's	No.	386	416	410	432	476
Man equivalents	No.	1.8	1.9	1.8	1.7	1.7
PMWU's/man eq.	No.	217	230	240	237	275
Cash rec./open A	Dol.	85	80	90	93	98
Cash exp./open A	Dol.	68	49	60	74	72
Mach. invest.	Dol.	4,700	5,300	5,500	7,700	8,200
Inv. bldg., fence/open A	Dol.	61	38	43	44	39
Total invest./open A	Dol.	262	222	259	254	253
Crop sales/open A	Dol.	22	22	26	31	27
Lives. sales/open A	Dol.	32	37	42	37	47
Operator's labor inc.	Dol.	1,690	1,730	2,260	1,410	4,090

might remain fairly constant since buildings and fences on rented land would not be considered part of the operator's investment. However, rented land would be considered as part of the total acres of open land from which average investment in buildings and fences per open acre was calculated.

Cash receipts per open acre increased $13, from $85 to $98, and cash expenses per open acre increased only $4, from $68 to $72. Changes in both of these factors were much smaller than respective changes on other farm types. The increase in cash expenses per open acre was smaller than expected since investment factors increased in approximately the same magnitude as did investment factors of cotton and crop-livestock farms.

Summary and Implications of Changes in Factors Considered to Affect Operator's Labor Income From Livestock-Crop Farms

Unit Approach livestock-crop farmers more than doubled their operator's labor income during the 5-year period. The 142 per cent change in operator's labor income exceeded percentage changes in factors considered to affect operator's labor income.

Factors that increased the most were total cash receipts (86 per cent), total cash expenses (82 per cent), livestock investment (74 per cent), machinery investment (74 per cent), acres open land (57 per cent), total investment (55 per cent), and livestock sales per open acre (47 per cent).

Livestock-crop farmers increased their labor efficiency more than did the operator's of the other three farm types. Despite increases in acres of open land and total PMWU's, the number of man equivalents decreased from 1.8 to 1.7 and the labor efficiency increased from 217 to 275 PMWU's per man equivalent. The increase in labor efficiency had an increasing effect on operator's labor income.

Cash receipts per open acre increased $13, and cash expenses per open acre increased $4. Prices of inputs and outputs were assumed constant; therefore, it was evident that increases in rates of production brought about the increase in cash receipts per open acre. Thus, increases in production rates did affect operator's labor income.

SUMMARY

Operator's labor income increased significantly during the 5-year study period for all types of farms. The increase in opera-

tor's labor income from cotton farms was greatest both in absolute and percentage increase. Dairy farms were the most profitable in both 1961 and 1965, although the percentage increase in operator's labor income was the smallest for the four farm types. As shown in the following table, income in 1965 was higher for the specialized cotton and dairy farms than for the diversified crop-livestock and livestock-crop farms.

Farm type	*1961 income*	*1965 income*	*Per cent change*
Cotton	$2,500	$6,560	162
Dairy	5,010	6,640	32
Crop-livestock	2,640	4,280	62
Livestock-crop	1,690	4,090	142

Significant changes occurred in almost all factors considered to affect operator's labor income. The major change that was common to all four types of farms was an increase in size. Some size indicators that increased were total cash receipts, total cash expenses, machinery investment, and total investment. Cotton farmers almost doubled their cotton acreage and dairy farmers increased the number of cows milked by 28 per cent.

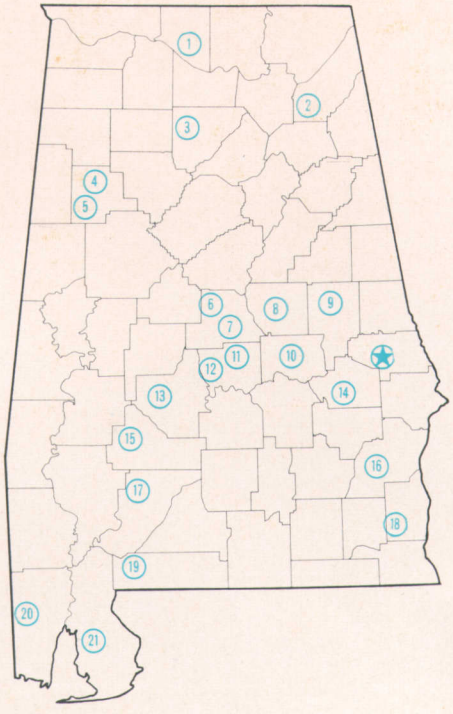
Crop-livestock and cotton farmers increased their acres of open land by 57 and 44 per cent, respectively, but reduced their labor force 6 and 11 per cent, respectively. This was accomplished by substituting machinery for labor. Dairy and livestock-crop farmers did not increase mechanization as much as cotton and crop-livestock farmers.

There was little change in the labor efficiency of dairy farmers, but the level of efficiency in both 1961 and 1965 was higher than for any other farm type. In 1965, only crop-livestock farms had a level of labor efficiency lower than 250 PMWU's per man equivalent.

Dairy and cotton farmers significantly improved their rates of production. Milk production per cow increased from an average of 5,300 to 6,800 pounds per year and cotton yield increased from 495 to 764 pounds of lint per acre. These improvements resulted in an increase in cash receipts per open acre, but these higher production rates were accompanied by an increase in cash expenses per open acre.

AGRICULTURAL EXPERIMENT STATION SYSTEM OF ALABAMA'S LAND-GRANT UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Thorsby Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. Tuskegee Experiment Field, Tuskegee.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Ornamental Horticulture Field Station, Spring Hill.
21. Gulf Coast Substation, Fairhope.